Building Systems of Systems Capabilities

Focusing on Mission Capability Areas and Weapon/Command & Control Systems

NDIA, October 22, 2002

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In response to questions about transformation efforts:

"It can be simply in connectivity," he said. "It can be in interoperability. It can be in taking things that every single one of which exists presently and managing them, using them, connecting them, arraying them in a way that has a result that is transformational."

-- Secretary Rumsfeld

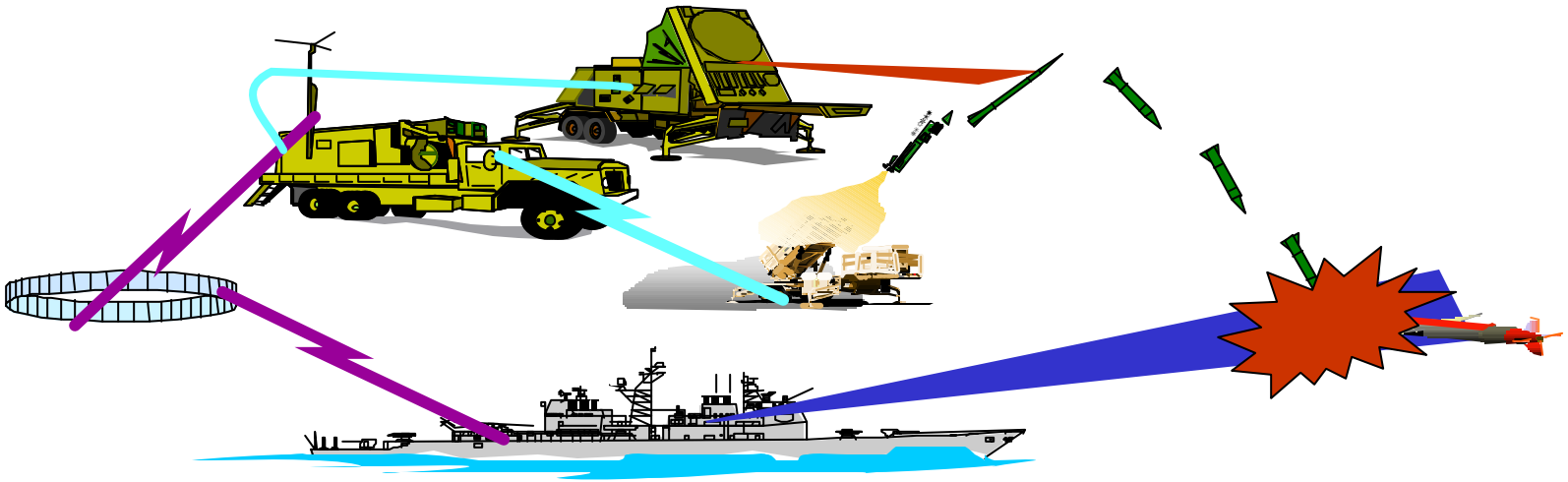
Speaking about the Service Chiefs:

"... it's their job to make proposals for systems that fall within their service, and then it's somebody else's job to take all of those proposals .... and bring them together and rationalize them and make them more coherent. "

-- Secretary Rumsfeld

WHAT IS INTEROPERABILITY ?

"We will connect Information systems and weapons in new ways"
President George Bush
New York Times, 25 March 2001



"The ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together."

(JCS Pub 1)

Focus is on Effective Joint and Combined Operations

Outline

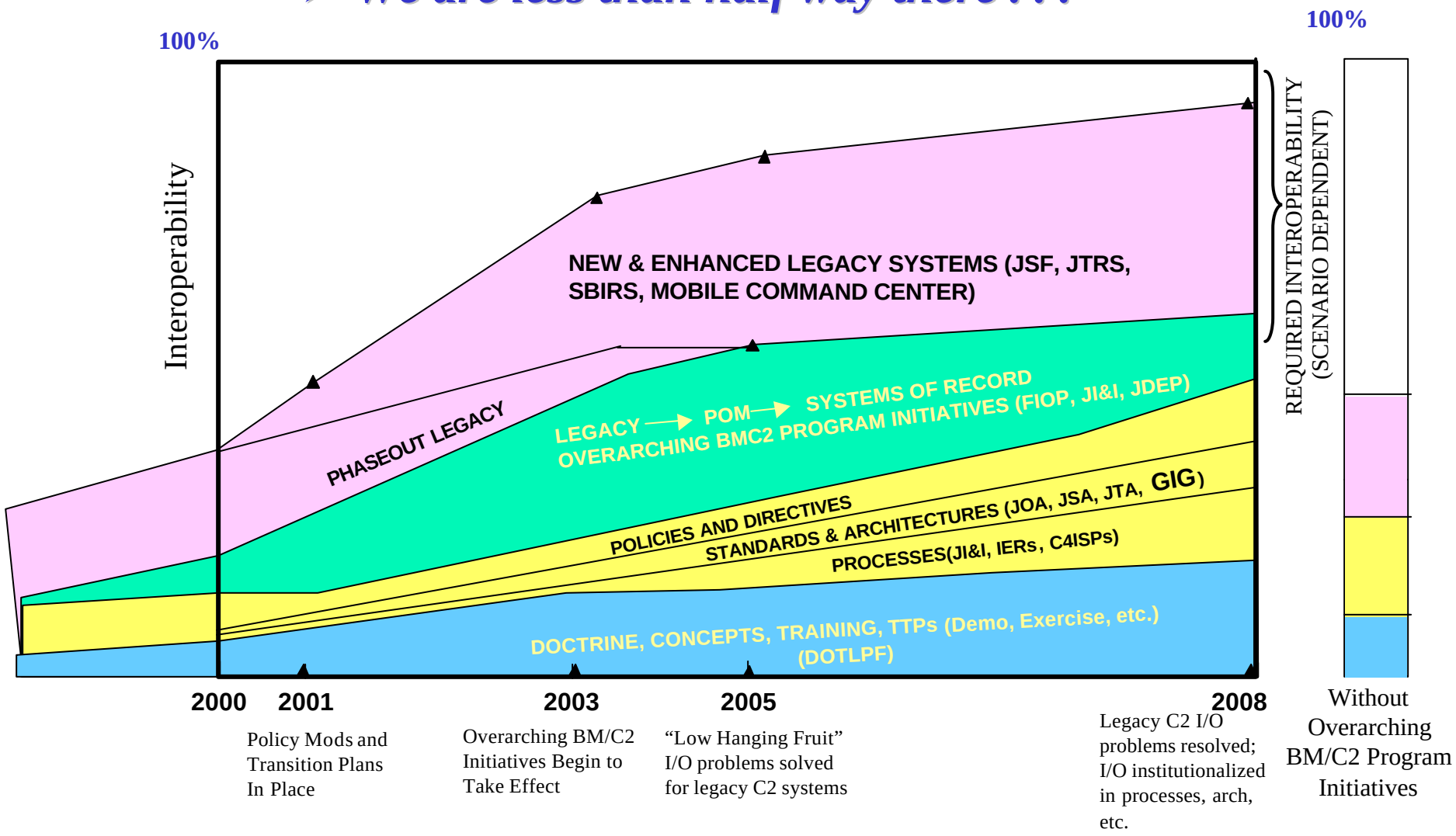
- **Where are we?**
  - **State of Interoperability in the Department**

- **What are we doing about it?**
  - **Institutionalizing Interoperability and Systems Integration**
    - ✓ **System of Systems (SoS) Mission Areas and Capabilities **
    - ✓ **Developing Systems Architectures with Emphasis on "Open Systems**
    - ✓ **Laying the Systems Engineering Foundation**

  - **Overarching Initiatives:** ***Successfully transitioned to Services!***

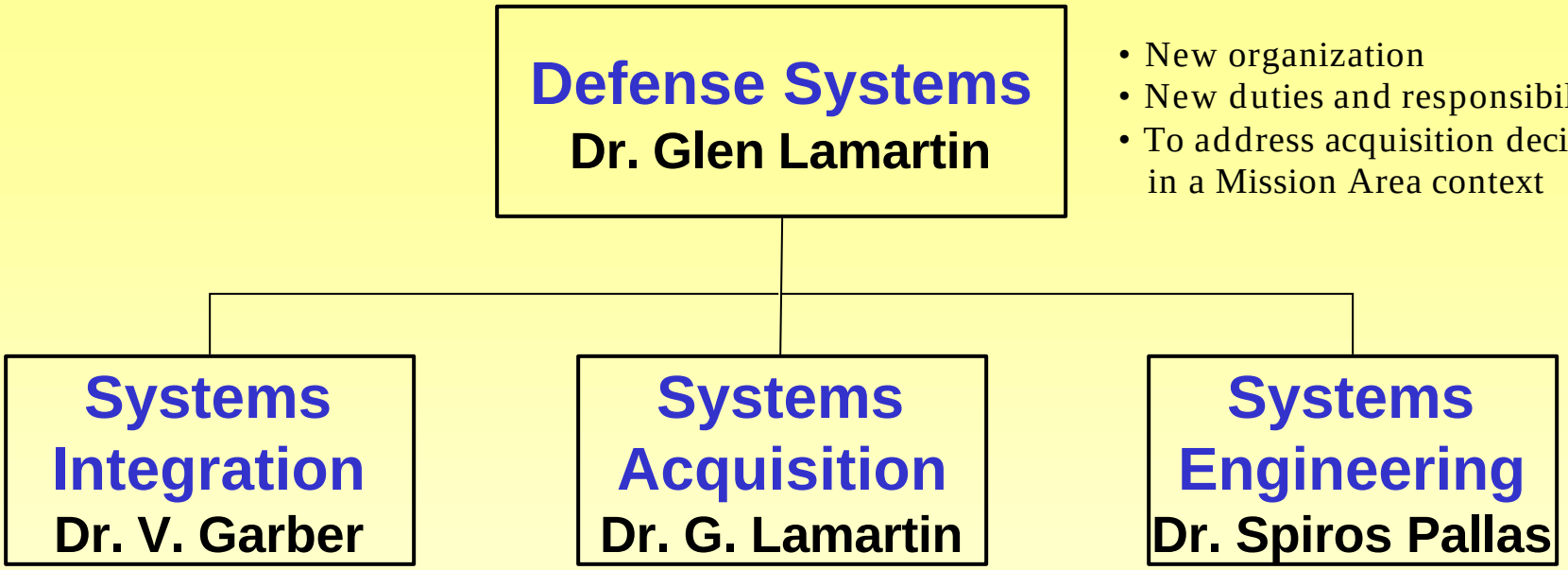
USAF Exec Agent	✓	**Family of Interoperable Operational Pictures (FIOP)**
USN Task Force Lead	✓	**Single Integrated Air Picture (SIAP)**
USA Lead	✓	**Single Integrated Ground Picture (SIGP)**
(5-Powers +)	✓	**Shared Tactical Ground Picture (STGP)**
USAF Exec Agent	✓	**Precision Engagement/Time Sensitive Targeting (PE/TST)**
Joint Staff Lead	✓	**Combat Identification (CID)**

- **Four major components are needed to address interoperability**
- ***We are less than half way there . . .***



Institutionalizing Interoperability and Systems Integration

"Defense Systems" created within the Office of the Under-Secretary of Defense for Acquisition, Technology, and Logistics [OUSD(AT&L)] by combining "Interoperability" and "Strategic and Tactical Systems"



Systems Integration

Figure out
"What are the right things to do"

- **Will work with the Joint Staff, Services, Combatant Commands, defense Agencies, and other OSD offices to help define joint integrated architectures for warfighting Capability Areas (e.g. Precision Engagement or Joint Theater Air and Missile Defense)**
- **Lead development of Systems View of the architectures defining what systems to bring together in a System-of-Systems approach to meet warfighter needs**
- **Represent development community in Joint Staff lead Operational View development**
- **Will**
  - ✓ **Lead cross-Department IPTs in each Capability Area**
  - ✓ **Help lay out capability roadmaps and allocate performance and schedule expectations to individual systems**
  - ✓ **Work to harmonize development plans and schedules**
  - ✓ **Lead Defense Systems engagement in the PPBS Program Review**

Acquisition Policy Changes
Draft Language*

Under Secretary of Defense (Acquisition, Technology, and Logistics) (USD(AT&L)) and Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD(C3I)) Joint Staff, Military Departments, Defense Agencies, Combatant Commanders, and other appropriate DoD Components shall work collaboratively to develop joint integrated architectures for capability areas as agreed to by the Joint Staff.

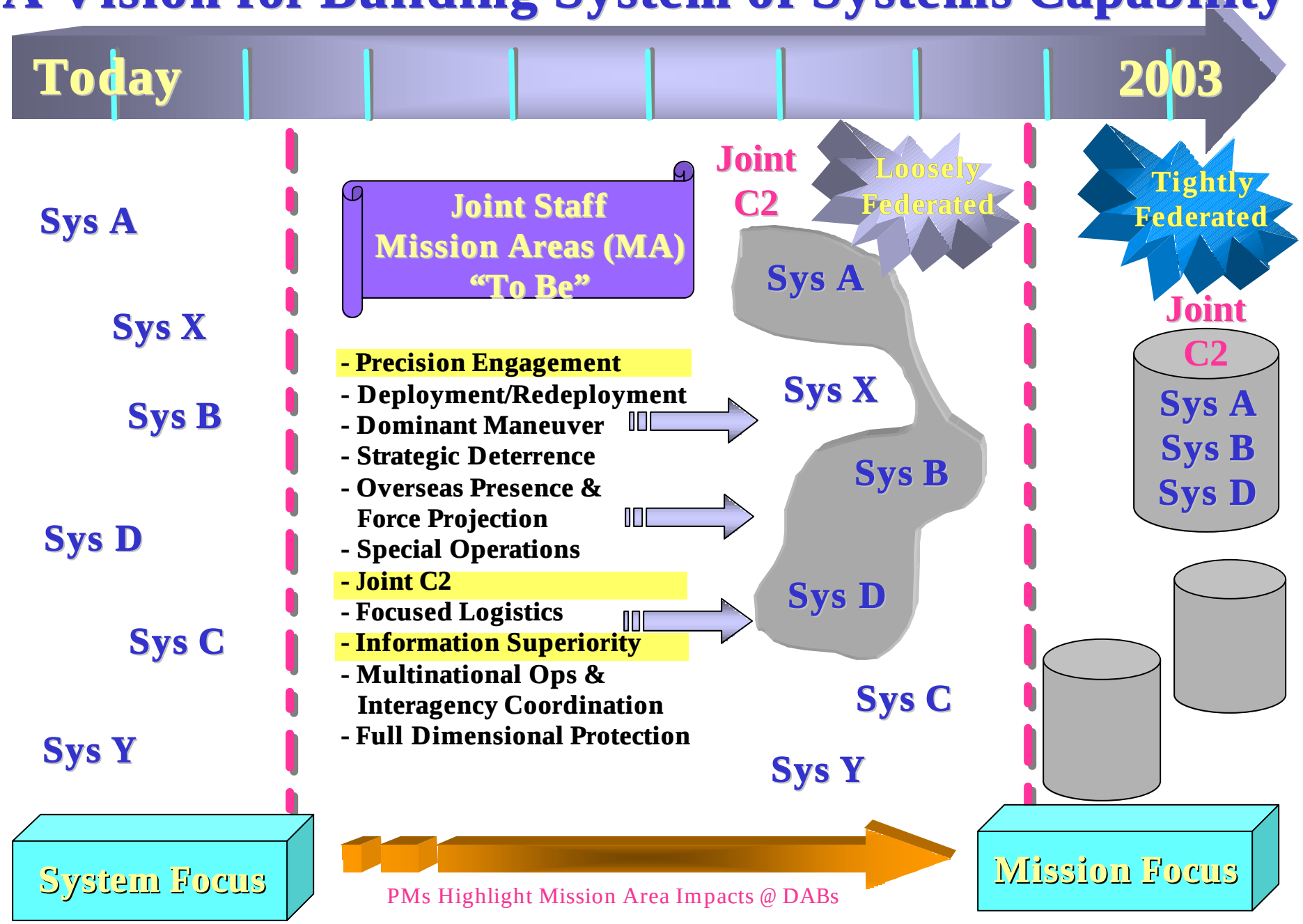
The Joint Staff (or Principal Staff Assistant for business areas) shall lead development of the operational view, in collaboration with the Services, Agencies, and Combatant Commanders, to describe the joint capabilities that the user seeks and how to employ them.

USD(AT&L) (or Principal Staff Assistant for business areas) shall lead development of the systems view, in collaboration with the Services, Agencies, and Combatant Commanders, to characterize available technology and systems functionality. The systems view shall identify the kinds of systems and integration needed to achieve the desired operational capability.

Using the integrated architectures, USD(AT&L) will lead development of integrated plans or roadmaps to guide systems development and the associated investment plans and to conduct capability assessments as the basis of aligning resources as an input to the Defense Planning Guidance, Program Objective Memorandum development, and Program and Budget Reviews.

*** Draft DoDI 5000.2, 18 Sep 2002**

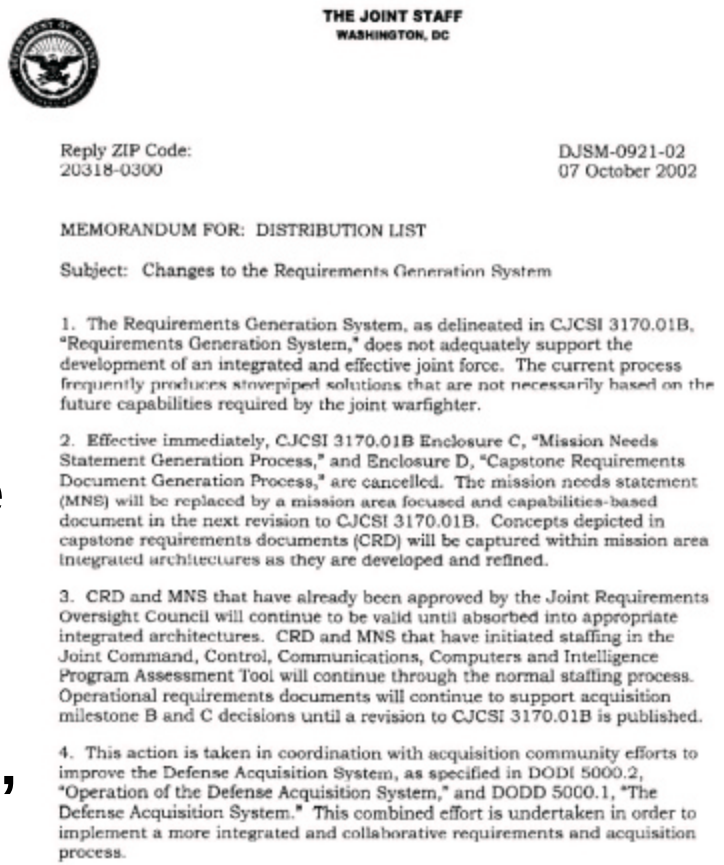
A Vision for Building System of Systems Capability



Requirements Generation System Changes

"… effort undertaken to implement a more integrated & collaborative requirements and acquisition process."

"Concepts depicted in capstone requirements documents (CRD) will be captured within mission area integrated architectures as they are developed and refined."



THE JOINT STAFF
WASHINGTON, DC

Reply ZIP Code:
20318-0300

DJSM-0921-02
07 October 2002

MEMORANDUM FOR: DISTRIBUTION LIST

Subject: Changes to the Requirements Generation System

1. The Requirements Generation System, as delineated in CJCSI 3170.01B, "Requirements Generation System," does not adequately support the development of an integrated and effective joint force. The current process frequently produces stovepiped solutions that are not necessarily based on the future capabilities required by the joint warfighter.

2. Effective immediately, CJCSI 3170.01B Enclosure C, "Mission Needs Statement Generation Process," and Enclosure D, "Capstone Requirements Document Generation Process," are cancelled. The mission needs statement (MNS) will be replaced by a mission area focused and capabilities-based document in the next revision to CJCSI 3170.01B. Concepts depicted in capstone requirements documents (CRD) will be captured within mission area integrated architectures as they are developed and refined.

3. CRD and MNS that have already been approved by the Joint Requirements Oversight Council will continue to be valid until absorbed into appropriate integrated architectures. CRD and MNS that have initiated staffing in the Joint Command, Control, Communications, Computers and Intelligence Program Assessment Tool will continue through the normal staffing process. Operational requirements documents will continue to support acquisition milestone B and C decisions until a revision to CJCSI 3170.01B is published.

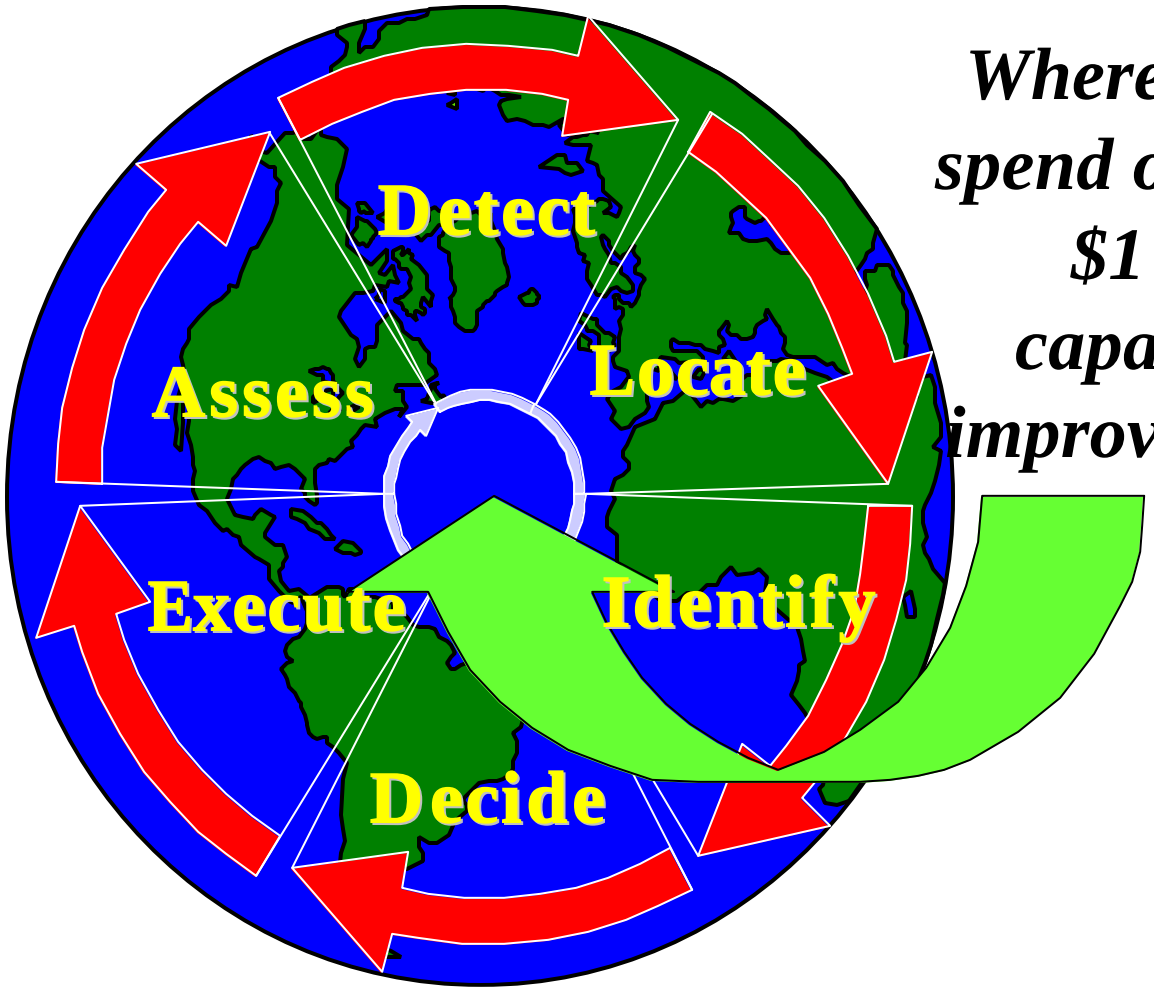
4. This action is taken in coordination with acquisition community efforts to improve the Defense Acquisition System, as specified in DODI 5000.2, "Operation of the Defense Acquisition System," and DODD 5000.1, "The Defense Acquisition System." This combined effort is undertaken in order to implement a more integrated and collaborative requirements and acquisition process.

Systems Integration Initiatives

- **Existing initiatives, including the following, will continue:**
  - **Precision Engagement / Time Sensitive Targeting**
  - **Family of Interoperable Operational Pictures (FIOP) including, but not limited to, the Single Integrated Air, Ground, and Maritime Pictures (SIAP, SIGP, SIMP)**
  - **Combat Identification (CID), Blue Forces Tracking (BFT)**

Precision Engagement / Time Sensitive Targeting (PE/TST)

First Order Assessment will support JROC's Precision Engagement Strategic Topic



Where do we spend our next $1 for capability improvement?

Precision Engagement (PE) / Time Sensitive Targeting (TST) Initiative

- **Summer 2001 Defense Science Board (DSB) Study on Precision Targeting**
  - **OSD/Joint Staff/Multi-Service/Agency Team scrubbed recommendations.**
  - **US Air Force, as Executive Agent, shepherded the selected recommendations through formal Service and JROC vetting. Conducted first Mission Area Review**
  - **JROC endorsement received on September 18, 2002.**
- **Next step: Continue review of PE/TST acquisition programs and initiatives. Conduct second Mission Area Review**
  - **Determine the "right things to do" in this mission area**
  - **Help lay out a capability roadmap.**
  - **Continue to perform "first order" assessments and determine where the Department spends its "next dollar" to achieve a capability improvement.**

Precision Engagement / Time Sensitive Target Integration

- **DSB recommendations in PE Block 0**
  - ***Link 16 Ground Target Message Set*** **to be implemented**
  - ***GRIDLOCK*** **to be partially implemented as ACTD; results of ACTD to be used to determine further implementation**
  - ***Accelerated production of the Digital Point Positioning Data Base (DPPDB)*** **and** ***study for a data link on small weapon*** **to be implemented if supplemental funding is available.**
- **Joint Requirements Oversight Council (JROC) endorsed on September 16, 2002.**

Family of Interoperable Operational Pictures (FIOP) Initiative

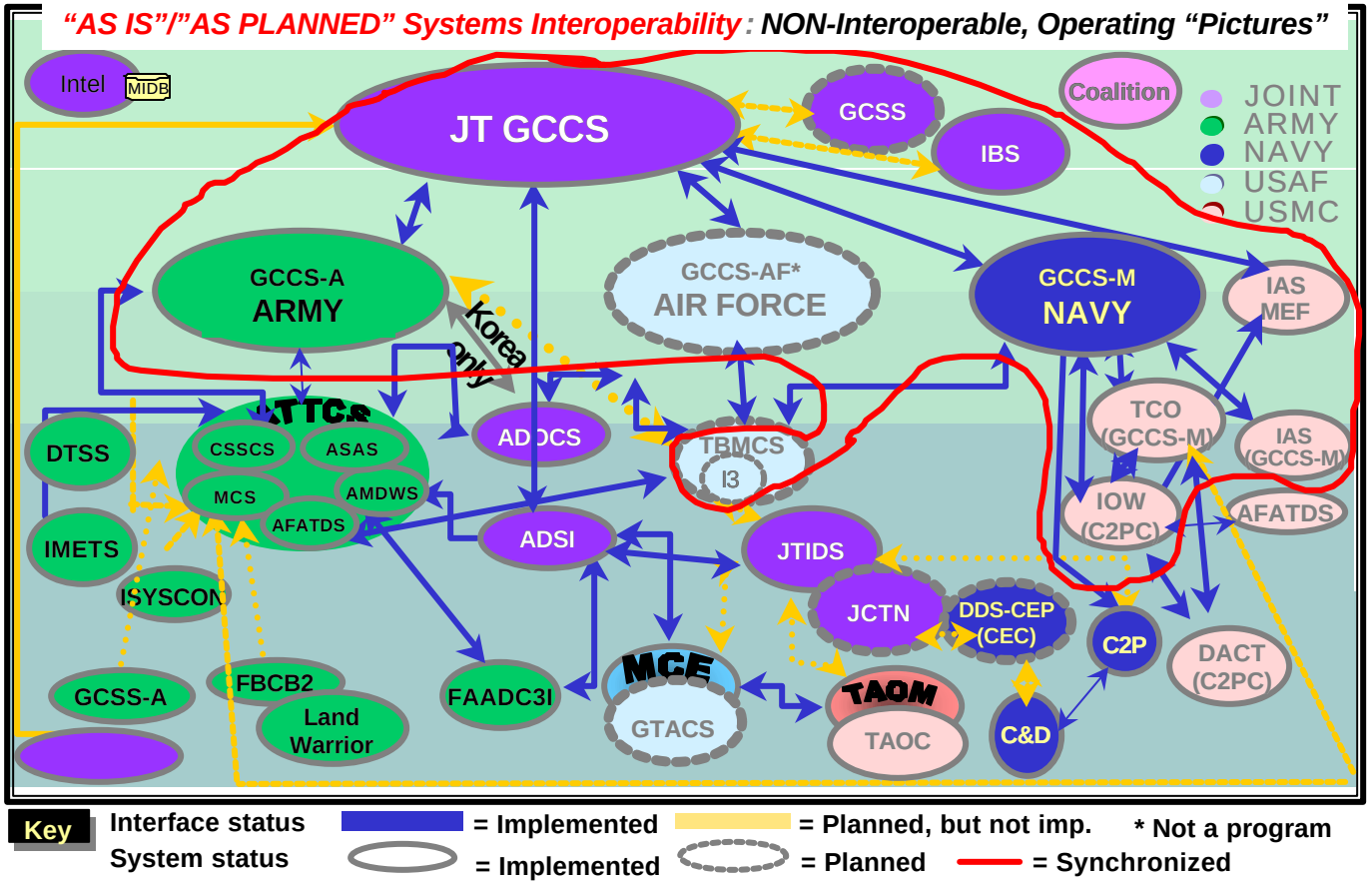
- **Interoperability related initiatives will continue**
- **Decision Superiority and Interoperability *enable* effective Systems-of-Systems capabilities (e.g., effective Battle Management C2 systems for PE/TST weapon systems)**
- **The FIOP initiative is Key to implementing Decision Superiority**

Today's Problem >$36B

As of Jun 00

No FIOP = Inadequate interoperability = fratricide, leakers, lack of effectiveness

USER/CONCEPT	CORRESPONDING SYSTEMS: "As-Is / As Planned"
Comb Cdr Operational-level "pics"	
JTF Tactical-level "pictures"	
Firing Unit Aerospace, Ground, Maritime "pictures"	



- *> $36B in our Key C2 systems that are NOT interoperable*
- *No coherent view of battlespace across echelons / between Services*
- *Lots of unique, point-to-point interfaces!*

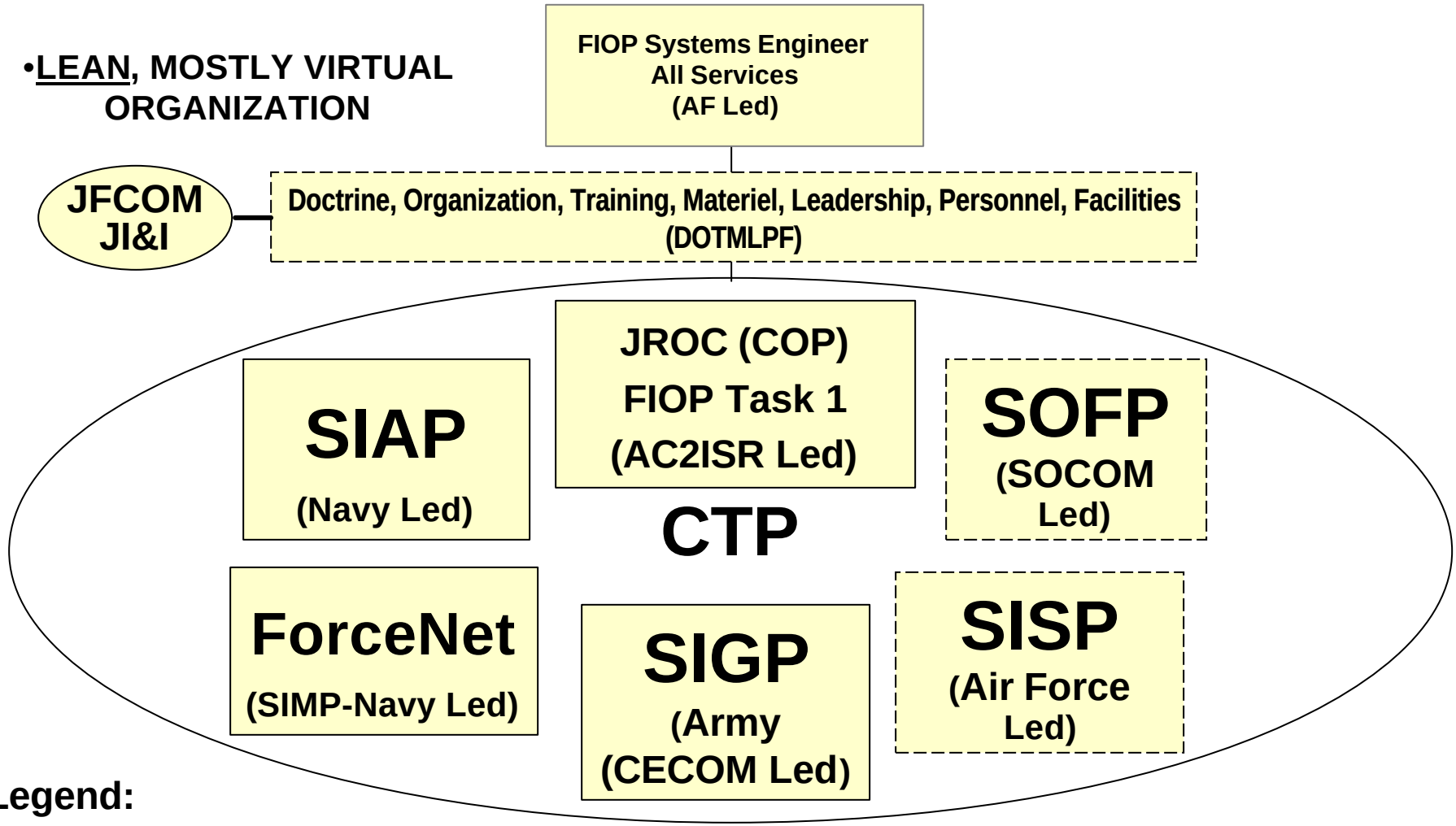
OUSD AT&L-Directed FIOP Tasks

- ☑ Ensure FIOP follows spiral acquisition strategy
- ☑ Recommend 80% solutions to those known, most pressing problems
- ☑ Recommend a lead Service Systems Engineering organizational structure
- ☑ Recommend a funding profile

☑ Services Completed

Service Led FIOP

•LEAN, MOSTLY VIRTUAL ORGANIZATION



Legend:

Establishment of SE Orgs will be via JROC (no preset timeframe)

Joint Distributed Engineering Plant (JDEP)

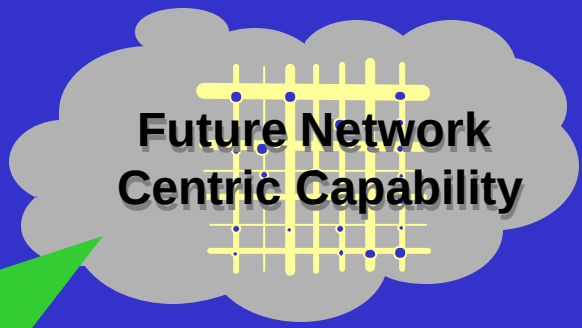
SIGP - Single Integrated Ground Picture
SIMP - Single Integrated Maritime Picture
SISP - Single Integrated Space Picture
SIAP - Single Integrated Air Picture
COP - Common Operational Picture
CTP - Common Tactical Picture
SOFP - Special Operation Force Picture

FIOP Spirals

- **Spiral 1(JROC FIOP):**
  - **Task 1.1 – Web Enabled Execution Management**
  - **Task 1.2 – Tactical COE Workstation**
  - **Task 1.3 – COE VMF Processing**
- **Spiral 2:**
  - **Friendly Forces SA**
  - **Red Force SA**
  - **Fire Support**
  - **ISR Management**
  - **JDN/JPN Integration**
  - **Infrastructure Services**
- **Spiral 3:**
  - **TBD**

Jumpstart for FIOP: "Joint Fires Network"

- Operational capability in use Today
- Provides a basis for next Spiral of FIOP, especially the ground picture
- Joint Staff supports



FIOP Direction Vector

Scalable
Open Systems Architecture
Operational Now
Investment Made

JFN Provides Initial Operational Capability

Legacy BM/C2 and Sensor Systems

Jumpstart For The FIOP - Emphasizing SIGP and PE

Elements of a “Joint Fires Network”

- USA Tactical Exploitation System (TES)
- USN Naval Fires Network (NFN)
- USAF ISR Manager
- USMC Tactical Exploitation Group (TEG)

Multi-INT network to enhance situational awareness, battle-management and C2 to enable sensor-to-shooter operations

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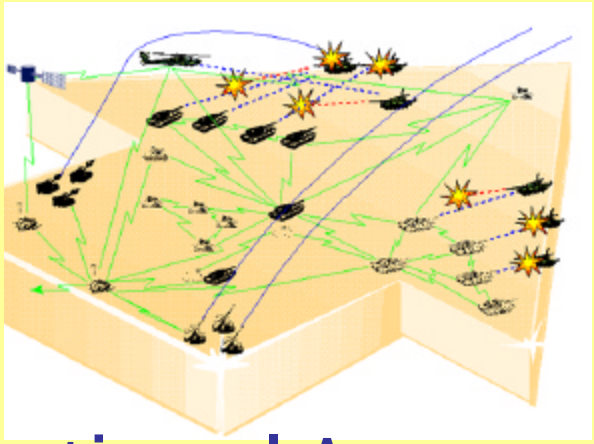
SIGNIFICANT EVENTS IN 2002

- All four services and the national agencies adopted TES as the basis for their wartime deployments

- Navy / Air Force Warfighter Talks: CNO and COS agreed to jointly develop their Time Sensitive Targeting capabilities and change names from NFN and ISR M to Joint Fires Network

Combat Identification (CID)



PLUS

Situational Awareness Target Identification

Equals

Fratricide Reduction and Increased Combat Effectiveness

Products= •"Don't shoot me" systems
•Situational awareness systems

plus

•Operational concept for CCID in CAS, MOUT, Mounted-dismounted Ops

Systems Integration

Overarching Architectures, Standards, S-O-S Testing

Director, Systems Integration / OSJTF	JMA #1	....	JMA# N	Service Systems INT	Non JMA Capabilities	
Force Integration	PE	IS/C2			CID	
Land				USA/USMC		
Sea				USN/USMC		
Air				USAF		
Strategic					X	
Electronic Warfare					EW	
Capability Analysis						X

Specific Integrated Architectures, Integrated Milestones, Plans for "Capability Drops" Investment plans, Budget issues

Conclusion

- **Systems Integration (what are the right things to do), Systems Acquisition (do those things) and Systems Engineering (do things right) are *required to ensure transformation***
- ***Build* Mission Area System-of-Systems capabilities based upon integrated architectures (Operational, Systems and Technical Views)**
- **Decision Superiority and Interoperability *enable* effective Systems-of-Systems capabilities**
- **FIOP is key to *implementing* Decision Superiority**
- **Efforts must evolve in cooperation with Allies and Coalition Partners**
- **Harness and adapt commercial IT technology and processes, *with emphasis on open systems architectures***